

CLAIMS

Sub A1

1. An isolated nucleic acid encoding an *B. fragilis* polypeptide of SEQ ID NOS: 5223 - 10444.

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2. A recombinant expression vector comprising the nucleic acid of Claim 1 operably linked to a transcription regulatory element.

3. A cell comprising a recombinant expression vector of Claim 2.

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4. A method for producing an *B. fragilis* polypeptide comprising culturing a cell of Claim 3 under conditions that permit expression of the polypeptide.

Sub A2

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5. An isolated nucleic acid selected from the group consisting of:

- (a) SEQ ID NOS: 1 - 5222;
- (b) a complement of SEQ ID NOS: 1 - 5222; or
- (c) an RNA of (a) or (b), wherein U is substituted for T.

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6. A recombinant expression vector comprising the nucleic acid of Claim 5 operably linked to a transcription regulatory element.

7. A cell comprising a recombinant expression vector of Claim 6.

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8. A method for producing an *B. fragilis* polypeptide comprising culturing a cell of Claim 7 under conditions that permit expression of the polypeptide.

Sub A3

9. A probe comprising a nucleotide sequence consisting of at least eight contiguous nucleotides of a nucleotide sequence selected from the group consisting of:

- (a) SEQ ID NOS: 1-5222;

- (b) a complement of SEQ ID NOS: 1- 5222; or
- (c) an RNA of (a) or (b), wherein U is substituted for T.

Sub A3 5 10. An isolated nucleic acid comprising a nucleotide sequence of at least eight nucleotides in length, wherein the sequence is hybridizable to a nucleic acid having a nucleotide sequence selected from the group consisting of:

- (a) SEQ ID NOS: 1 -5222;
- (b) a complement of SEQ ID NOS: 1-5222; or
- (c) an RNA of (a) or (b), wherein U is substituted for T.

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11. A vaccine composition for prevention or treatment of an *B. fragilis* infection comprising a nucleic acid of Claim 5 and a pharmaceutically acceptable carrier.

12. A vaccine composition of Claim 11, further comprising an adjuvant.

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13. A vaccine composition of Claim 11, further comprising one or more additional ingredients.

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14. A method of treating a subject for *B. fragilis* infection comprising administering to a subject a vaccine composition of Claim 11, such that treatment of *B. fragilis* infection occurs.

15. A method of Claim 14, wherein the treatment is a prophylactic treatment.

25 16. A method of Claim 14, wherein the treatment is a therapeutic treatment.

17. A recombinant or substantially pure preparation of an *B. fragilis* polypeptide or a fragment thereof, wherein said *B. fragilis* polypeptide is SEQ ID NOS: 5223 - 10444.

18. A vaccine composition for prevention or treatment of an *B. fragilis* infection comprising an *B. fragilis* polypeptide of Claim 17 and a pharmaceutically acceptable carrier.
- 5 19. A vaccine composition of Claim 18, further comprising an adjuvant.
20. A vaccine composition of Claim 18, further comprising one or more additional ingredients.
- 10 21. A method of treating a subject for *B. fragilis* infection comprising administering to a subject a vaccine composition of Claim 18, such that treatment of *B. fragilis* infection occurs.
22. A method of Claim 21, wherein the treatment is a prophylactic treatment.
- 15 23. A method of Claim 21, wherein the treatment is a therapeutic treatment.
24. A method for detecting the presence or absence of a *Bacteroides* nucleic acid in a sample comprising:
- 20 (a) contacting a sample with the nucleic acid of Claim 5 under conditions in which a hybrid can form between a probe comprising a nucleotide sequence consisting of at least eight contiguous nucleotides of a nucleotide sequence selected from the group consisting of SEQ ID NOS: 1-5222 or a complement of SEQ ID NOS: 1-5222 and a *Bacteroides*
- 25 nucleic acid in the sample; and
- (b) detecting the hybrid formed in step (a), wherein detection of a hybrid indicates the presence or absence of a *Bacteroides* nucleic acid in the sample.

25. A computer readable medium having recorded thereon a nucleotide sequence selected from the group consisting of:
- (a) SEQ ID NOS: 1-5222;
 - (b) a complement of SEQ ID NOS: 1- 5222;
 - 5 (c) an RNA of (a) or (b), wherein U is substituted for T; or
 - (d) a fragment of (a), (b) or (c).
26. A computer based system for identifying fragments of the *Bacteroides* genome of comprising;
- 10 a) a data storage means comprising a nucleotide sequence selected from the group consisting of SEQ ID NOS: 1-5222, a complement of SEQ ID NOS: 1-5222, or a fragment thereof,
 - b) a search means for comparing a target sequence to the nucleotide sequences of the data storage means of step (a) to identify homologous sequences, and;
 - 15 c) a retrieval means for obtaining said homologous sequences(s) of step (b).
27. A method of identifying nucleic acid fragments of a *Bacteroides* genome comprising comparing a database comprising a nucleotide sequence selected from the group consisting of SEQ ID NOS: 1-5222; a complement of SEQ ID NOS: 1-5222; or a fragment thereof with a target sequence to obtain a nucleic acid molecule comprised of a complementary nucleotide sequence to said target sequence, wherein said target sequence is not randomly selected.
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28. A method for identifying an expression modulating fragment of the *Bacteroides* genome comprising comparing a database comprising a nucleotide sequence selected from the group consisting of SEQ ID NOS: 1- 5222; a complement of SEQ ID NOS: 1-5222; or fragment thereof with a target sequence to obtain a nucleic acid molecule comprised of a complementary nucleotide sequence to said
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target sequence, wherein said target sequence comprises sequences known to regulate gene expression.

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